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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/604,010	06/20/2003	STEVEN J. SEIPP	FIS920030142US1	1009
29371	7590	12/01/2005	EXAMINER	
CANTOR COLBURN LLP 55 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002			STOCK JR, GORDON J	
			ART UNIT	PAPER NUMBER
			2877	

DATE MAILED: 12/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/604,010

Applicant(s)

SEIPP, STEVEN J.

Examiner

Gordon J. Stock

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 July 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 10-20 is/are rejected.
- 7) ☒ Claim(s) 8 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 June 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>20030620;20030714</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statements (IDS) submitted on June 20, 2003 and July 14, 2003 have been considered by the examiner.

Drawings and Specification

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: **70i** of Fig. 2; **111** of Fig. 3; **224** of Fig. 4. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.
3. The drawings and specification are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: **70** of Fig. 2. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each

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drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

4. Fig. 1b is objected to for the following: '4b' should read -46--. Correction is required.
5. Fig. 2 is objected to for the following: there are two '70b' signs referring to two different locations on the wafer. Correction is required.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. **Claims 1-5, 10, and 11** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Gotoh et al. (6,225,011)**.

As for **claim 1**, Gotoh in a method for manufacturing semiconductor devices discloses the following: disposing a patterned substrate in an exposure system with an alignment routine (col. 2, lines 10-15 and 20-25); locating a first point of interest on the patterned substrate (Fig. 5a: 8 and Fig. 5b: one array of marks in 5 different exposure fields); scanning a first area proximate the first point of interest for a first unique feature (col. 2, lines 24-25); defining a periodicity for the patterned substrate as defined by a constant pitch from a mask (col. 2, lines 20-22); locating a second point of interest based on the periodicity (Fig. 5a: 8, a second mark and

Fig. 5b: a second array of marks in 5 different exposure fields); scanning a second area proximate the second point of interest for a second unique feature corresponding to the first unique feature (again, col. 2, lines 24-25 with Fig. 5a: 8, a second mark in first array of distortion marks and Fig. 5b: a second array of marks in 5 different exposure fields); gathering alignment data from at least scanning the first and second areas (col. 2, lines 24-26); determining substrate position relative to the exposure system from alignment data of at least the first and second scanned areas (col. 2, lines 25-30). As for a stage, Gotoh is silent in the particular prior art embodiments, but he teaches a stage in Fig. 10 with a stage control unit (Fig. 10: 18). It would be obvious to one of ordinary skill in the art at the time the invention was made to have the system comprise a stage in order to provide support and relative positioning means for the wafer.

As for **claim 2**, Gotoh discloses everything as above (see **claim 1**). In addition, he discloses aligning the substrate relative to the exposure system (col. 2, lines 25-30).

As for **claim 3**, Gotoh discloses everything as above (see **claim 1**). In addition, he discloses exposing the wafer with the exposure system (col. 2, lines 23-24).

As for **claim 4**, Gotoh discloses everything as above (see **claim 1**). In addition, the substrate is a semiconductor wafer (Fig. 5b: 1).

As for **claim 5**, Gotoh discloses everything as above (see **claim 1**). In addition, he discloses the first and second unique features include alignment marks on the substrate (col. 2, line 12-15; Fig. 5a: 8; Fig. 5b: 8a).

As for **claim 10**, Gotoh discloses everything as above (see **claim 1**). In addition, he discloses a plurality of exposure fields (Fig. 5b: 8a); wherein the method comprises at least one

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of measuring at least one point of interest in each field of a plurality of exposure fields (col. 2, lines 18-30).

As for **claim 11**, Gotoh discloses everything as above (see **claim 1**). In addition, he discloses the substrate comprising a plurality of exposure fields, wherein each exposure field comprises at least one unique feature (Fig. 5b: 8a; wherein, each field comprising a plurality of distortion marks such as 8 from Fig. 5a).

8. **Claims 6, 8, 12-16, 18-20** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Gotoh et al. (6,225,011)** in view of **Utsunomiya (6,801,825)**.

As for **claim 6**, Gotoh discloses everything as above (see claim 1). He is silent concerning mapping first and second points of interests and corresponding unique features to determine an orientation of substrate. However, Utsunomiya in a semiconductor exposure apparatus management system teaches mapping features (Figs. 2, 3a, 3b, 3c, Fig. 12a: 1113). Therefore, it would be obvious to one skilled in the art at the time the invention was made to map the points of interests and marks of wafer to determine orientation error of the wafer in order correct for each measurement coordinate on the wafer.

As for **claim 8**, Gotoh discloses everything as above (see **claim 1**). He is silent concerning a path for automatic correction should the alignment routine fail to align. However, Utsunomiya in a semiconductor exposure apparatus management system teaches an automatic correction (Fig. 12b: feedback from 1119 to 1120 to B). Therefore, it would be obvious to one skilled in the art at the time the invention was made to provide automatic correction should alignment routine fail to align in order to provide iterative feedback to improve alignment accuracy.

As for **claim 12**, Gotoh in a method of manufacturing semiconductor devices discloses the following: defining a point of interest for each segment of the patterned substrate (Fig. 5a: 8; Fig. 5b: 8 wherein, at least one point of interest, an exposure field, in at least 5 segments comprising an exposure field consisting of an array of distortion marks); locating a first point of interest in a first segment as demonstrated through scanning the distortion marks; wherein, at least a first area proximate the first point of interest for a first unique feature, a distortion mark, is scanned (col. 2, lines 24-25); defining a periodicity for the patterned substrate as defined by a constant pitch from a mask (col. 2, lines 20-22); locating a second point of interest in a second segment based on the periodicity; wherein a second area proximate the second point of interest for a second unique feature, a second distortion mark of a second array of marks, corresponding to the first unique feature (col. 2, lines 24-25; Fig. 5b: 8a); measuring the second point of interest (col. 2, lines 25-30); locating a third point of interest in a third segment based on the periodicity (Fig. 5b: 8a—third exposure field of five exposure fields). As for saving a scanned image of the first area and mapping the alignment of the substrate with respect to the tooling in which it was disposed, Gotoh is silent. However, Utsunomiya in a semiconductor exposure apparatus management system teaches mapping features (Figs. 2, 3a, 3b, 3c, Fig. 12a: 1113) and demonstrates saving an image of area of measurement for reference (Fig 7; col. 5, lines 40-50). Therefore, it would be obvious to one skilled in the art at the time the invention was made to map the points of interests and marks of wafer to determine orientation error of the wafer in order correct for each measurement coordinate on the wafer. And it would be obvious to one skilled in the art at the time the invention was made to save a scanned image of the first area of

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measurement in order to determine distortion by measuring displacement at a plurality of points in the image.

As for **claim 13**, Gotoh in view of Utsonimya discloses everything as above (see **claim 12**). In addition, Gotoh discloses exposing the wafer with the exposure system (col. 2, lines 23-24).

As for **claim 14**, Gotoh in view of Utsonimya discloses everything as above (see **claim 12**). In addition, Gotoh discloses the substrate is a semiconductor wafer (Fig. 5b: 1).

As for **claim 15**, Gotoh in view of Utsonimya discloses everything as above (see **claim 12**). In addition, Gotoh discloses the first and second unique features include alignment marks on the substrate (col. 2, line 12-15; Fig. 5a: 8; Fig. 5b: 8a).

As for **claim 16**, Gotoh in view of Utsonimya discloses everything as above (see **claim 12**). In addition, Gotoh in view of Utsonimya discloses the alignment data determines an orientation of the substrate relative to the tooling, exposure system (col. 2, lines 25-31).

As for **claim 18**, Gotoh in view of Utsonimya discloses everything as above (see **claim 12**). In addition, Gotoh discloses a plurality of exposure fields each corresponding to a segment of the wafer (Fig. 5b: 8a); wherein the method comprises at least one of measuring at least one point of interest in each field of a plurality of exposure fields (col. 2, lines 18-30).

As for **claim 19**, Gotoh in view of Utsonimya discloses everything as above (see **claim 12**). In addition, Gotoh discloses the substrate comprising a plurality of exposure fields corresponding to a segment of the wafer, wherein each exposure field comprises at least one unique feature (Fig. 5b: 8a; wherein, each field comprising a plurality of distortion marks such as 8 from Fig. 5a).

As for **claim 20**, Gotoh in view of Utsonimya discloses everything as above (see **claim 12**). In addition, each unique feature, distortion mark, is similarly oriented with respect to each corresponding segment, area on the wafer (Fig. 5a: 8; Fig. 5b: 8a with five different segments with each segment having a exposure field).

9. **Claim 7** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Gotoh et al. (6,225,011)** in view of **Tanimoto et al. (4,769,523)**.

As for **claim 7**, Gotoh discloses everything as above (see **claim 1**). In addition, the fields are scanned (Fig. 5a: 8; Fig. 5b: 8a; col. 2, lines 24-25). He is silent concerning raster scanning. However, Tanimoto teaches raster scanning for alignment (col. 9, lines 60-65). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to raster scan the wafer in order to measure alignment from die to die on the wafer.

10. **Claim 17** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Gotoh et al. (6,225,011)** in view of **Utsunomiya (6,801,825)** further in view of **Tanimoto et al. (4,769,523)**.

As for **claim 17**, Gotoh in view of Utsunomiya discloses everything as above (see **claim 1**). In addition, Gotoh discloses the fields are scanned (Fig. 5a: 8; Fig. 5b: 8a; col. 2, lines 24-25). He is silent concerning raster scanning. However, Tanimoto teaches raster scanning for alignment (col. 9, lines 60-65). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to raster scan the wafer in order to measure alignment from die to die on the wafer.

Allowable Subject Matter

11. **Claim 8** is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

As to **claim 8**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in a method of aligning a substrate to an exposure system the first unique feature is saved as an alignment image for use in locating the second unique feature in the second area, in combination with the rest of the limitations of **claim 8**.

Fax/Telephone Numbers

If the applicant wishes to send a fax dealing with either a proposed amendment or a discussion with a phone interview, then the fax should:

- 1) Contain either a statement "DRAFT" or "PROPOSED AMENDMENT" on the fax cover sheet; and
- 2) Should be unsigned by the attorney or agent.

This will ensure that it will not be entered into the case and will be forwarded to the examiner as quickly as possible.

Papers related to the application may be submitted to Group 2800 by Fax transmission. Papers should be faxed to Group 2800 via the PTO Fax machine located in Crystal Plaza 4. The form of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The CP4 Fax Machine number is: (571) 273-8300

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gordon J. Stock whose telephone number is (571) 272-2431.

The examiner can normally be reached on Monday-Friday, 10:00 a.m. - 6:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

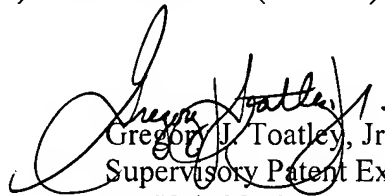
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supervisor, Gregory J. Toatley, Jr., can be reached at 571-272-2800 ext 77.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private Pair system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

gs

November 25, 2005


Gregory J. Toatley, Jr.
Supervisory Patent Examiner
Art Unit 2877
28 Nov 05